

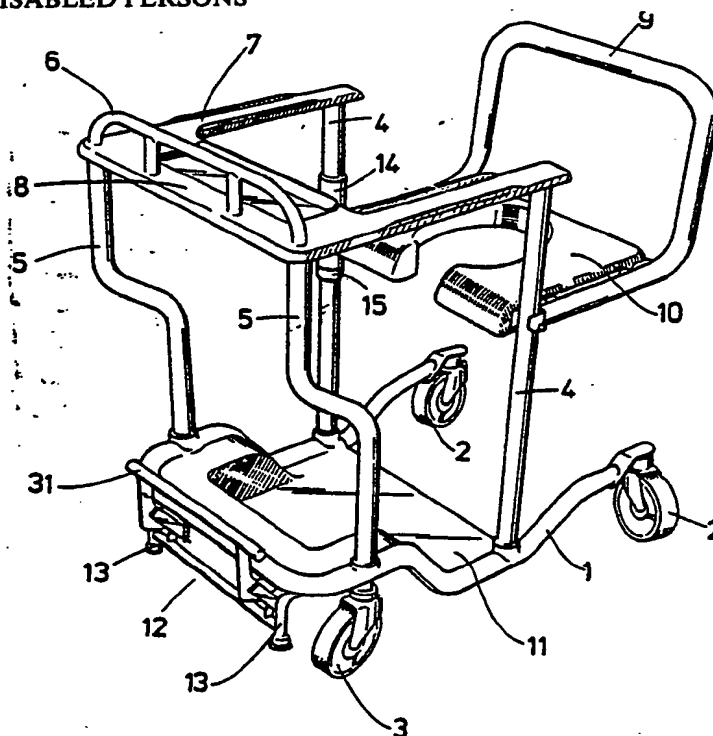


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/SE89/00013 <b>(22) International Filing Date:</b> 18 January 1989 (18.01.89) <b>(31) Priority Application Number:</b> 8800591-3 <b>(32) Priority Date:</b> 19 February 1988 (19.02.88) <b>(33) Priority Country:</b> SE  <b>(71) Applicant (for all designated States except US):</b> AHLBERGS MEKANISKA VERKSTAD [SE/SE]; Box 25, S-190 70 Fjärdhundra (SE).  <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only) :</b> AHLBERG, Rolf [SE/SE]; Box 2071, S-733 00 Sala (SE). DANIELSSON, Jan, Erik [SE/SE]; Gustav Adolfsgatan 7E, S-733 00 Sala (SE).  <b>(74) Agents:</b> SVANFELDT, Hans-Åke et al.; Dr Ludwig Brann Patentbyrå AB, Drottninggatan 7, Box 1344, S-751 43 Uppsala (SE).		<b>(81) Designated States:</b> AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK, FI, FR (European patent), GB (European patent), IT (European patent), LU (European patent), NL (European patent), NO, SE (European patent), US.  <b>Published</b> <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>

(54) Title: TRANSPORT CHAIR FOR DISABLED PERSONS

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## (57) Abstract

Invalid roller chair including wheeled base structure (1), with posts (4, 5) vertically upstanding from the base structure, and a seat (10) or the like arranged at two of the pillars. What is novel with the chair is that the seat (10) is arranged on a rear part (9) which is swingable in a horizontal direction and which at one side is mounted for rotation on one of a pair (4) of vertical posts, between which the rear part is intended to be carried, and in that the rear part has on its other side a latching means (18, 19) for latching of the rear part between the two posts (4).

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## TRANSPORT CHAIR FOR DISABLED PERSONS

The present invention relates to an invalid roller chair including a wheeled base structure, vertically upstanding posts mounted on the base structure and a seat or the like arranged at the posts. A chair of the above described kind is known from SE-A-883/72, SE-A-14774/72, SE-A-7403868.8 SE-A-7612118-5 and SE-A-8828-71. These known devices can be divided into two categories, namely such as are provided with seats and such as are provided with patient support means in the form of a harness.

Patient support means in the form of a harness are experienced as unpleasant and undignified, and are therefore only used when a patient is to be transferred from a bed to a chair or from the bed to the toilet. Putting the harness on the patient takes time.

Invalid roller chairs of the kind including a seat can in turn be divided into two categories, namely such where the seat is facing forwards in the direction of movement of the chair and such where the seat faces backwards. Invalid roller chairs of the first-mentioned kind are difficult to mount from a bed and require the presence of two nurses for lifting the patient from the bed to the chair. The second category of invalid roller chairs provided with seats is illustrated in the mentioned SE-A-3056/72. This known device includes a wheeled base structure with a vertically upstanding post mounted on it. Mounted on the post and projecting out from it there is a seat which is adjustable in height and which can be thrust in between the legs of the patient and under the patient's bottom for subsequent raising at least sufficiently for the patient's weight to be transferred to the seat for allowing the patient to be moved unhindered from the bed. A disadvantage with this known device is that the patient sits astride on a seat. This requires both a sense of balance and that the patient has sufficient muscle strength to keep himself on the chair. If the patient loses his grip he falls off the chair.

The present invention has the object of achieving an invalid roller chair while avoiding the disadvantages of the known art, and where the chair can easily be mounted from such as a bed and which moves the patient safely. With this purpose in mind, the chair has a rear part which can be swung in a horizontal direction and which is provided with the seat of the device. In addition, the rear part can be raised and lowered along the post, about which it can be swung in a horizontal direction. By these measures it is possible to mount the chair from behind, and only one attendant is required to help the patient to mount the chair. Mounting takes place in the following manner. The patient in the bed rises by himself, or with the aid of the attendant, into the sitting position and swings his legs out over the edge of the bed, so that he sits in a natural attitude on the edge of the bed with his legs hanging downwards. The rear part of the chair is swung completely to one side for providing an opening through which the patient mounts the chair from behind. The chair is then backed in towards the patient so far that the patient can grip the forward handle on the chair with his hands. The parking brake of the chair is applied. The patient then places his feet on the floor of the chair and keeps his hands on the forward handle. After this, either by himself or with the aid of the attendant, the patient rises a small amount sufficient to form a small space between his bottom and the top of the bed. The attendant now swings the rear part with its seat under the patient's bottom (possibly after having moved the rear part a distance upwards or downwards along the mentioned post) thus closing the mounting opening, the rear part then being locked in the swung-in position. The patient then sits on the seat, the parking brake is released and the attendant moves off with the patient in the chair. The patient is now facing forwards in the direction of travel and is surrounded forwards, rearwards and both sides by tubular railing protecting him from falling out of the chair.

The invalid roller chair in accordance with the invention allows the patient to sit in the chair and attend to his

natural evacuation needs. Different alternatives are conceivable, depending on individual needs and the patient's physical condition. In one alternative the patient can rise in the chair, with his feet resting on the floor of the chair and his hands on the forward handle, whereupon the rear part with the seat is swung away to provide the mounting opening of the chair, which is then backed in towards the w.c., the parking brake is applied and the patient sits down on the w.c. Another alternative, based on a distinguishing feature of the invention, i.e. that the seat is removable from the rear part, involves that the chair is backed in towards the w.c., the parking brake is applied and the seat is lifted away, whereafter the patient sits on the w.c. with his feet resting on the floor of the chair. A still further alternative is that the chair has a seat (illustrated on the drawings) formed after the fashion of a w.c. seat and the patient remains sitting on this seat while he attends to his evacuation needs with the chair backed over a w.c. All three alternatives allow the patient to have support from the railing and forward handle or rail of the chair.

The rear part is adjustable in height along the mentioned post for adjusting the height of the seat to the furniture on which the patient will sit. More specifically, there is a support collar and a locking pin which are adjustable in height on the respective post on which they are mounted.

The invalid roller chair in accordance with the invention can be equipped with many additional appliances such as knee support, bag for toilet articles etc, allowing the chair to be used, e.g. in a shower with the patient sitting in the chair.

The invention will now be described in more detail and in connection with the accompanying drawings, where

Figure 1 is a perspective view of the invalid roller chair seen obliquely from the front and with the seat

swung in,

Figure 2 is a perspective view of the chair in Figure 1 seen obliquely from behind and with the seat swung out,

Figure 3 illustrates the locking device of the seat,

Figure 4 is a perspective view of the parking brake, and

Figure 5 is a detail view of the parking brake.

The invalid roller chair of Figure 1 has a base structure 1 with a pair of rear castor wheels 2 and a pair of forward castor wheels 3. On either side of the base structure, approximately at the middle thereof, there is a pair of vertically upstanding posts 4, and forwards on the base structure there is a pair of forward vertical posts 5. A handle or rail 6 extends between the forward posts, and side rails 7 extend between the forward and rear posts on either side of the thus formed roller chair. The side rails 7 are suitably formed integral with a work table 8 extending between the forward posts. The chair has a horizontally swingably rear part 9 with a seat 10. The base structure is provided with a basket or floor 11 for the patient's feet. Farthest forward, the chair is provided with a parking brake 12 in the form of a structure pivotably mounted on the base structure and provided with support feet 13.

The rear part 9 includes a U-shaped member with its legs formed into an L shape, such that the leg portion joining on to the bar of the U are substantially vertical and the free ends of the legs substantially horizontal. The vertical portions form a back support, and the seat 10 is removably attached between the free leg portions. The right-hand leg of the back part 9 (seen in the direction of forward travel of the chair) is provided with a rotatable mounting 14 in the form of a sleeve welded to the end of the leg in the manner illustrated, with the rotating axis at right angle to the

horizontal plane of the seat. The mounting 14 rests against a support collar 15 which can be fixed to the appropriate one of the vertical rear posts 4. The seat can thus be swung in a horizontal plane around the post as well as slide axially up and down along it, the latter movement downwards being limited by the fixed support collar 15. This collar is adjustable to different heights with the aid of suitable (unillustrated) means such as pin and slot or wedge means, for adjusting the height of the seat to the different bed or furniture heights. In Figure 2 the horizontal swinging movement is illustrated by the double arrow 16 and the axial movement by the double arrow 17. A U-shaped latching member 18 is welded to the free end of the left-hand leg (seen in the direction of forward travel) of the rear part 9. The legs of the member 18 are intended to accommodate between them the left-hand post 4 and come into engagement with a latching pin 19 (Figure 3). For this purpose one of the legs of the latching member 18 is downwardly provided with a slot 20 accommodating the pin 19. This leg is also provided with a bevelled portion 21 from the slot to its forward end. When the rear part is swung from the open position illustrated in Figure 2, where the mounting opening is accessible, to the closed position illustrated in Figure 1, the bevelled portion 21 will glide against the pin 19 and facilitate the engagement of the pin in the slot 20. This is also assisted by the ability of the rear part 9 to move upwards in the direction of the arrow 17. When the patient is sitting properly on the seat, his weight contributes to secure latching of the seat in the position illustrated in Figure 1. In this position, the weight of the patient is thus taken up by the latching pin 19 and by the support collar 15. As the support collar is adjustable to different heights, so is the latching pin 19 also adjustable to different heights, e.g. by being insertable in a series of vertical holes in the left-hand post 4. Figure 3 schematically illustrates the means by which the seat is removably attached to the rear part. These means include pins 22 arranged on both sides of the seat, and a plurality of cutouts made in steel strips 23, which are rigidly mounted on the inside of the legs. These cutouts are

open upwards and are inclined at an angle forwards-downwards and are intended to accomodate the pins 22.

It will be seen from Figures 1 and 2 that the base structure 1 is U-shaped, as seen from above, the bar of the U being forwards in the direction of forward travel of the chair. Seen from one side, the base structure has a swan neck form both forward and rearwards, to provide space for the castor wheels 2 and 3. The rearward, upward curved portions denoted by 24 and 25 of the legs in Figure 2 and the portions of the legs which continue from these portions towards the rear posts 4 are the only parts projecting out from the chair when the seat is in the swung-out position illustrated in Figure 2. In this position of the seat the chair can be backed in towards the long side of a bed until the rear posts come into contact with the edge of the bed. The free height for the rear portion of the chair is thus the height above the floor of the upwardly curved portions 24 and 25 of the base structure 1. Due to the positions of the rear posts 4 approximately at the middle of the legs of the base structure, the chair is stable when the patient stands on the floor 11, and there is no risk of the chair tipping over. The weight of the patient reinforces the latching action of the latching means by the weight of the patient pressing the slot 20 against the upper side of the latching pin 19. An attendant can optionally assist at the mounting movement by placing himself in front of the work table 8 with his hip portion in contact with the forward edge thereof, simultaneously as from the front he lifts the patient under the arms until the patient stands firmly on the floor 11, the seat 10 then being swung in under the patient's bottom.

The side rails 7 and handle 6 afford support to the patient so that he can sit with the upper part of his body upright. Instead of the illustrated seat 10, which has an opening corresponding to that of a w.c. seat, an upholstered soft cushion can be used when the patient is to sit for a longer time in the chair, e.g. for therapeutic work.



The floor 11 is molded in one piece from such as ABS plastics. Its outer contour follows the contour of the base structure 1 and in the forward portions it has an upstanding coaming, illustrated in Figure 2, which prevents the patient's feet coming into contact with the forward castor wheels 3. The flat part of the floor must have sufficient strength so that one can stand on it without it collapsing. It is therefore suitable to arrange transverse (unillustrated) reinforcing members on the underside of the floor, these members extending from side to side between the legs of the base structure 1.

The parking brake 12 is illustrated in detail in Figures 4 and 5. The brake includes two curved support legs 27, 28, each of which is pivotably mounted on a respective one of the legs of the base structure 1. In Figure 5 will be seen the mounting of the support leg 28 on the journaling pin 29. Downwardly, each support leg has the mentioned support feet 13 and they are mutually joined by a cross member 30. The structure formed by the support legs and cross member can be swung with the aid of a system of articulated joints between a retracted position in which the brake is not applied, with the support feet 13 at a distance above the floor surface, and a parking position in which the feet 13 are in contact with the floor and the forward portion of the entire chair, in particular the forward castor wheels, is raised a short distance above the floor surface. The chair can thus not be moved when it is in the parking position. The mentioned articulated joint system is operated by a "parking pedal" 31 intended for operation by the attendant using one foot. In Figure 1 the parking pedal or bar 31 is illustrated in the retracted position of the brake and in Figure 4 in the parking position. The articulated joint system comprises two identical units, and only one of theses will be described in more detail in connection with Figure 5. At either end portion of the bar 31 there is welded one leg of a V-shaped plate 32, 33. The other leg 34 (illustrated in Figure 5) of the plate 32 is pivotably mounted on a transverse support rod 35, which

in turn is welded at its opposing end portion to the bar of the U-shaped base structure 1. On either side of the plate 32 there is a link 36, 37 upwardly journaled on the journaling pin 38 passing through the V-shaped plate 32, and downwardly connected articulately via a journaling pin 39 to a lug 40, 41 welded at either end portion of the transverse member 30. A stop 42 welded near the apex of the V-shaped plate 32 limits the pivoting movement downwards of the support legs 27, 28. A spring 43 extends between the journaling pin 39 and the support rod 35 to keep the structure formed by the support legs 27, 28 and transverse member 30 in a retracted position.

The invalid roller chair described above can be modified and varied in many different ways. For example, a sheet of material serving as knee protector, and suitably upholstered can extend between the forward posts 5. An unillustrated basket for personal effects or for toilet articles can be attached to one side rail 7. The rear part 9 can also be provided with attachment for an upholstered plate intended to serve as a soft back support, as well as refined means for adjusting height.

## CLAIMS

1. Invalid roller chair, including a wheeled base structure (1) with posts (4, 5) vertically upstanding from the base structure and a seat (10) or the like arranged at a pair of the posts, characterized in that the seat (10) is disposed on a rear part (9) which is swingable in a horizontal direction and at one side is rotatably mounted in one of a first pair (4) of two posts arranged one on either side of the base structure, between which posts the rear part is intended to be carried, and in that the rear part (9) on its side remote from the rotatably mounted side has a latching member (18) for latching of the rear part between the two posts (4).
2. Chair as claimed in claim 1, characterized in that the rear part (9) has tubular frame in which the seat (10) is removably attached.
3. Chair as claimed in claim 1 or 2, characterized in that the tubular frame is bent to form a back support.
4. Chair as claimed in one or more of the preceding claims, characterized by a rotatable mounting (14) which is fixed to the rear part at said one side, at right angles to the substantially horizontal seat (10), and which is mounted for rotation and axial displacement in respect of said post, and by an annular collar (15) arranged on said one post (4) for supporting the mounting (14).
5. Chair as claimed in one or more of the preceding claims, characterized in that the latching member (18) includes a U-shaped member, one leg of which has a slot (20) intended to accomodate a locking pin (19) arranged on the other of the two posts (4) and projecting radially out from it.
6. Chair as claimed in one or more of claims 1-5, characterized in that the support collar (15) and latching pin (19) are adjustable in height along the respective post (4).

7. Chair as claimed in one or more of the preceding claims, characterized by a second pair (5) of posts mounted one on either side of the base structure, in front of the first pair (14) and carrying between them a transverse handle or railing (6), which the patient can grip with both hands.

8. Chair as claimed in one or more of the preceding claims, characterized by a floor (11) arranged at the base structure between the two pairs (4, 5) of posts, said floor being intended for being stood on by the patient.

9. Chair as claimed in one or more of the preceding claims, characterized in that the base structure (1) substantially includes a U-shaped frame (seen from above), in that each of the first (4) pair of posts is mounted at approximately half the length of the respective leg, in that each of a first (2) pair of castor wheels is mounted in the end portion of each leg to form the rear wheels of the chair, and in that each of a second (3) pair of castor wheels is mounted on either side of, and close to, the bar of the U-shaped frame to form the front wheels of the chair.

10. Chair as claimed in one or more of the preceding claims, characterized in that the U-shaped frame (1), as seen from one side, has swan-necked portions forwardly at the bar portion of the U-shape, and backwardly (24, 25) at the rear wheels, and in that the forward and rear wheels (2, 3) are arranged under said swan-neck portions of the frame.

11. Chair as claimed in one or more of the preceding claims, characterized by a parking brake (12) arranged at the forward bar portion of the U-shaped frame.

12. Chair as claimed in one or more of the preceding claims, characterized in that the parking brake includes a pivotable structure (27, 28, 30) with support feet (13), an operating bar (31) and an articulated joint mechanism (32, 36, 37, 35,

40) between the operating bar and the pivotable structure for pivoting the structure between a retracted position in which the support feet are spaced from the floor surface, and in which the chair can roll on the castor wheels (2, 3), and a parking position in which the support feet (13) carry the forward portion of the chair with the forward wheel pair (13) raised a distance above the floor surface.

13. Chair as claimed in one or more of the preceding claims, characterized by a substantially U-shaped table top, carried by the four posts (4, 5) upwardly thereon, the bar portion of said U-shaped top having a length which is greater than the distance between the legs, to form a work surface, the legs (7) thus serving as side rails for supporting the patient.



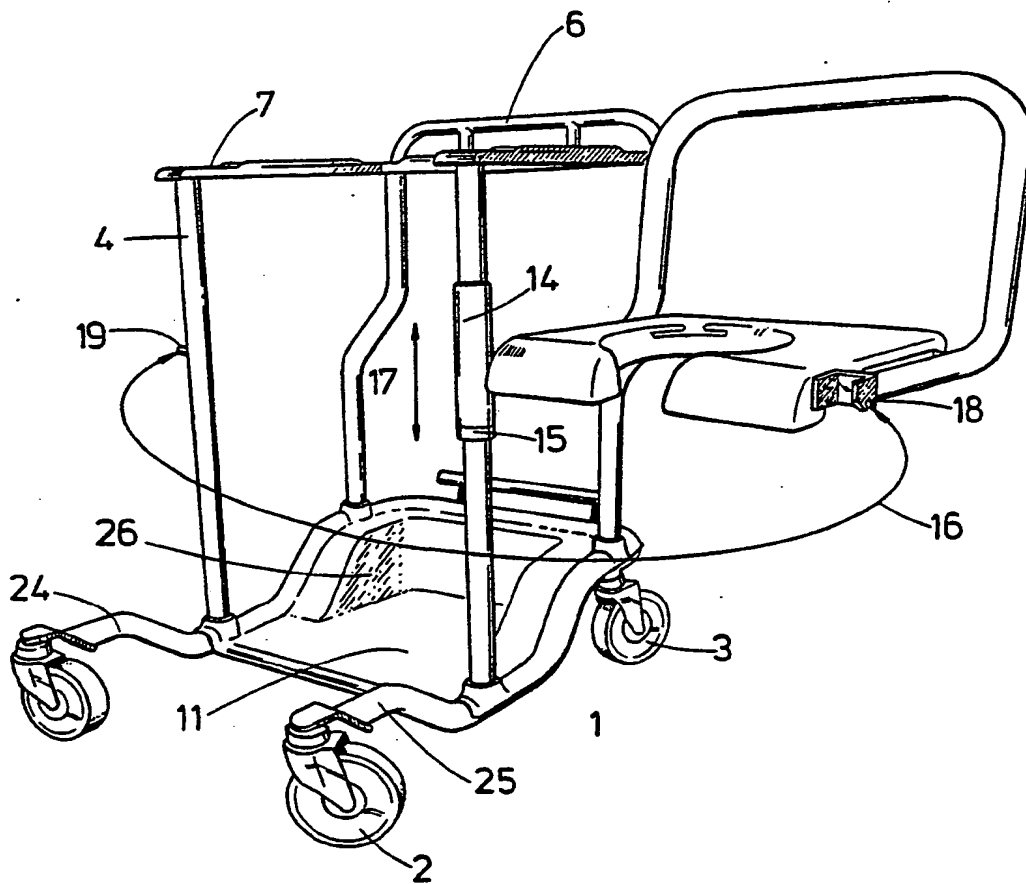
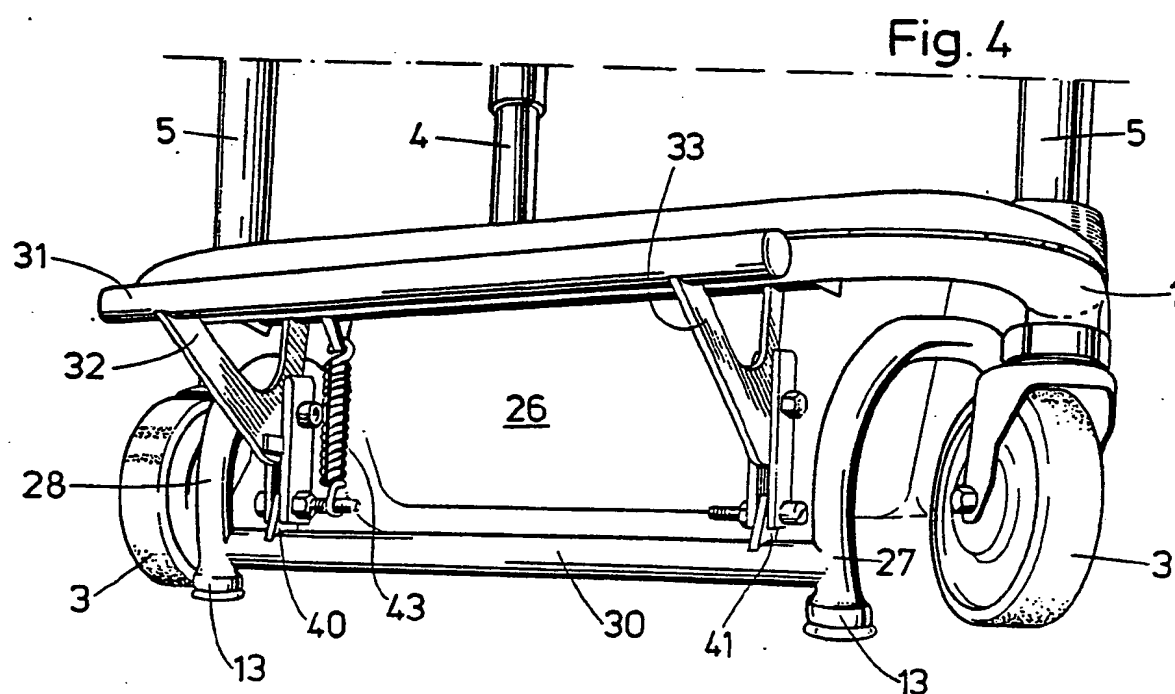
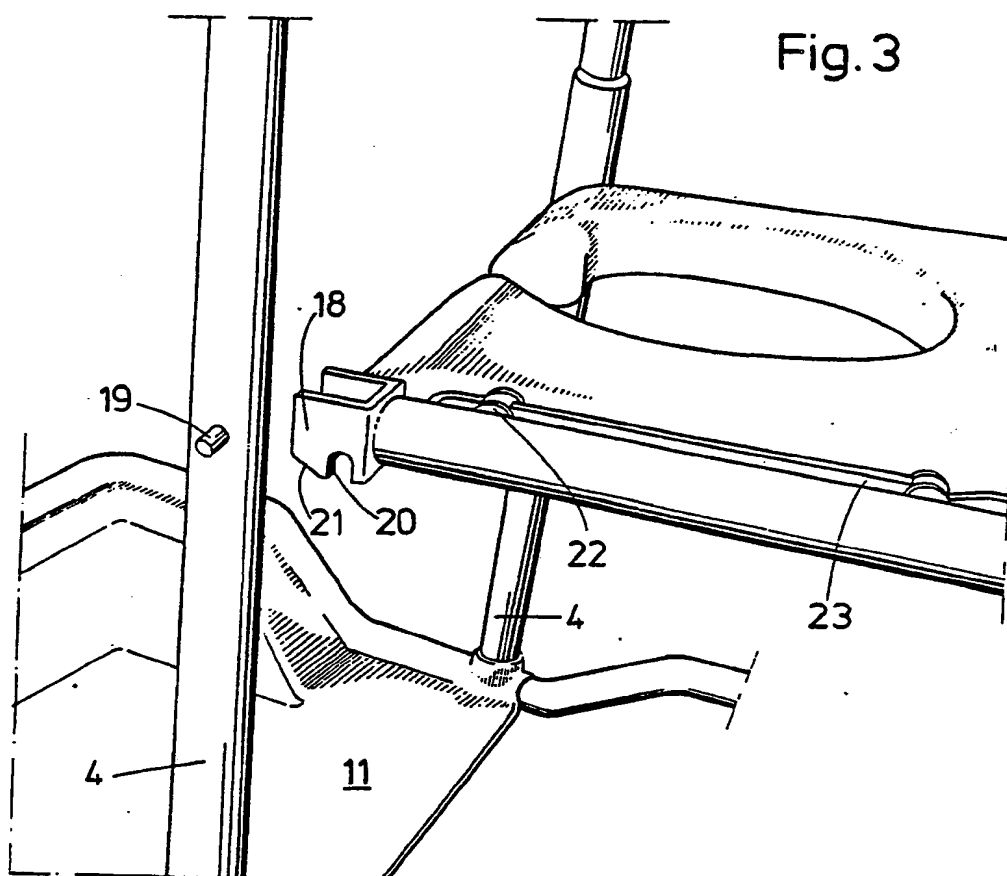


Fig. 2





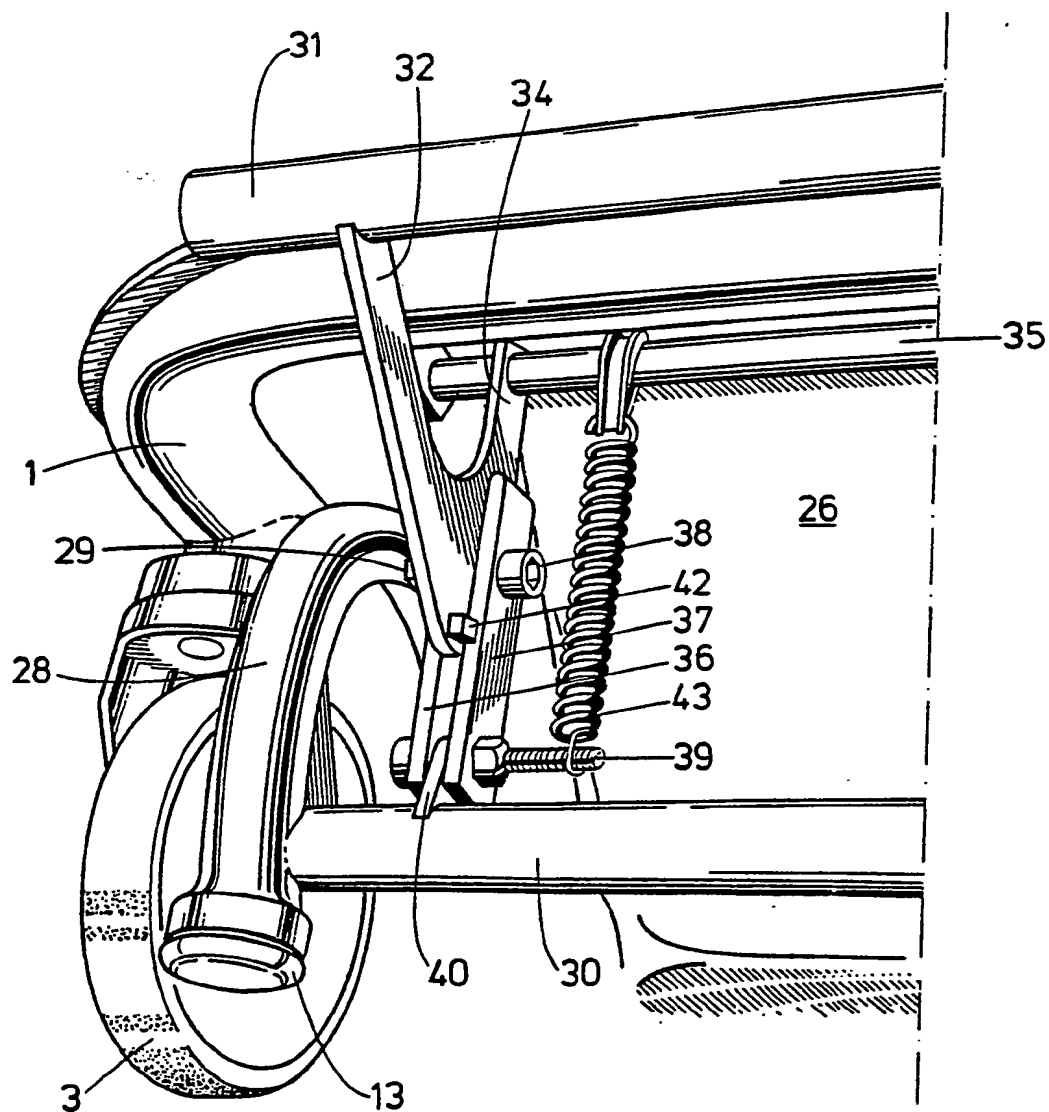


Fig. 5

# INTERNATIONAL SEARCH REPORT

International Application No PCT/SE89/00013

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup> According to International Patent Classification (IPC) or to both National Classification and IPC <sup>4</sup> <div style="text-align: center; padding: 5px;">A 61 G 5/00 // A 61 H 3/04</div>																				
<b>II. FIELDS SEARCHED</b> <div style="text-align: center; padding: 5px;">Minimum Documentation Searched <sup>7</sup></div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 20%; padding: 5px;">Classification System</th> <th style="padding: 5px;">Classification Symbols</th> </tr> <tr> <td style="padding: 5px;">IPC4 US C1</td> <td style="padding: 5px;">A 47 K 13/10; A 61 G 5/00, 02; A 61 H 3/00, 04 4: 185, 560-566; 272: 70.3, 70.4; 280: 42, 87.02, 03, 05, 647-650; 297: 5,6</td> </tr> </table> <div style="text-align: center; padding: 5px;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup></div> <div style="padding: 10px 5px 5px 5px;">SE, NO, DK, FI classes as above</div>			Classification System	Classification Symbols	IPC4 US C1	A 47 K 13/10; A 61 G 5/00, 02; A 61 H 3/00, 04 4: 185, 560-566; 272: 70.3, 70.4; 280: 42, 87.02, 03, 05, 647-650; 297: 5,6														
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<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT <sup>9</sup></b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; padding: 5px;">Category <sup>9</sup></th> <th style="width: 70%; padding: 5px;">Citation of Document, <sup>11</sup> with Indication, where appropriate, of the relevant passages <sup>12</sup></th> <th style="width: 20%; padding: 5px;">Relevant to Claim No. <sup>13</sup></th> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">DE, B, 1 025 100 (HEINZ ROEHRICH K. G.) 27 February 1958</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1, 5</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">FR, A, 2 068 065 (MURGUET R. ET AL) 20 August 1971</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1, 4</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">GB, A, 2 113 086 (JAMES GAVIN SPENCER ET AL) 3 August 1983</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1, 8</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US, A, 2 759 525 (E. F. RIES) 21 August 1956</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">US, A, 4 261 561 (ILON) 14 April 1981</td> <td style="text-align: center; vertical-align: top; padding: 5px;">9,10</td> </tr> </table>			Category <sup>9</sup>	Citation of Document, <sup>11</sup> with Indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>	A	DE, B, 1 025 100 (HEINZ ROEHRICH K. G.) 27 February 1958	1, 5	A	FR, A, 2 068 065 (MURGUET R. ET AL) 20 August 1971	1, 4	A	GB, A, 2 113 086 (JAMES GAVIN SPENCER ET AL) 3 August 1983	1, 8	X	US, A, 2 759 525 (E. F. RIES) 21 August 1956	1	A	US, A, 4 261 561 (ILON) 14 April 1981	9,10
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<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><sup>10</sup> Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"A" document member of the same patent family</p> </div> </div>																				
<b>IV. CERTIFICATION</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">           Date of the Actual Completion of the International Search  <div style="text-align: center; padding: 5px;">1989-04-06</div> </td> <td style="width: 50%; padding: 5px;">           Date of Mailing of this International Search Report  <div style="text-align: center; padding: 5px;">1989 -05- 1 1</div> </td> </tr> <tr> <td style="padding: 5px;">           International Searching Authority  <div style="text-align: center; padding: 5px;">Swedish Patent Office</div> </td> <td style="padding: 5px;">           Signature of Authorized Officer  <div style="text-align: center; padding: 5px;">               Nils Andersson           </div> </td> </tr> </table>			Date of the Actual Completion of the International Search <div style="text-align: center; padding: 5px;">1989-04-06</div>	Date of Mailing of this International Search Report <div style="text-align: center; padding: 5px;">1989 -05- 1 1</div>	International Searching Authority <div style="text-align: center; padding: 5px;">Swedish Patent Office</div>	Signature of Authorized Officer <div style="text-align: center; padding: 5px;">               Nils Andersson           </div>														
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